WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2006AR122B

Title: Sediment Characterization in Three Coves - Beaver Reservoir, Arkansas

Project Type:: Research

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End Date: 03/14/2007

Congressional District: 3

Focus Categories: Sediments, Non Point Pollution, Surface Water

Keywords: sediment, lacustrine, metals, tracer, land-use

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Federal Funds: $16,900

Non-Federal Matching Funds: $33,954

Abstract: Coring of sediments in three coves of Beaver Reservoir (northwest Arkansas) is proposed in order to characterize chemistry of sediments accumulating within the reservoir at the terminus of sub-watersheds in which different land use histories have occurred. Monte Ne Cove lies at the mouth of a sub-watershed in which land use changed from largely agriculture to industrial and (increasingly) residential development during the last 40 years. Prairie Creek Cove lies at the mouth of a sub-watershed in which land use changed from largely agricultural to urban and residential development during the last 40 years. Blackburn Creek Cove lies at the mouth of a nearly pristine, forested watershed protected by the Hobbs Wildlife Management Area during the last 40 years, and serves as a control site to characterize natural background sedimentation.

Sediment cores (up to 2 m in length) from each cove will be acquired using standard coring methods. These cores will be prepared and sampled for major elements, trace metals, and nutrients (P,N) using EPA protocols. All chemical analyses will be conducted at the Water Quality Lab of the Arkansas Water

Resources Center or an independent, EPA-certified environmental chemistry lab (e.g. New Mexico State University). Metals to be analyzed include Al, Fe, Mn (major elements), Pb, Hg, Cu, Ni, Cd, Cr, and Zn (trace metals).

It is hypothesized that sedimentation within each cove has varied over time, and that sediment accumulating in these three coves recorded the dominant mode of land use and land use change within each sub-watershed as distinctive chemical signatures related to agriculture, industrialization, urbanization, or forest preservation. Results of this research will 1) provide needed baseline data to be used for future monitoring of sediment chemistry and water quality, 2) assist in developing models for sediment yield from watersheds as a consequence of land use change, 3) aid in defining sediment budgets and contaminant mass balances, 4) aid development of models of mobilization and transport of contaminants resulting from different land use practices, and 5) provide data for understanding effects of sediment/sediment contaminants on surface water quality.